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L1: Entry 1 of 1

File: USPT

Jun 2, 1987

US-PAT-NO: 4669745

DOCUMENT-IDENTIFIER: US 4669745 A

TITLE: Apparatus for controlling steering angle of rear wheels of a vehicle

DATE-ISSUED: June 2, 1987

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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APPL-NO: 06/ 782051 [PALM]

DATE FILED: September 30, 1985

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	59-207876	October 3, 1984
JP	59-243856	November 19, 1984

INT-CL: [04] B62D 6/02

US-CL-ISSUED: 280/91; 180/140

US-CL-CURRENT: 180/410

FIELD-OF-SEARCH: 280/91, 280/98, 280/99, 280/96, 280/103, 180/140, 180/234, 180/79, 180/141, 180/142, 180/236

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>4146244</u>	March 1979	Presley	280/96
<input type="checkbox"/> <u>4541499</u>	September 1985	Yanai	180/142
<input type="checkbox"/> <u>4572316</u>	February 1986	Kanazawa et al.	280/91

ART-UNIT: 316.

PRIMARY-EXAMINER: Love; John J.

ASSISTANT-EXAMINER: Ferriter; Karin

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ABSTRACT:

An apparatus for controlling steer angle of rear wheels of a 4-wheel steering vehicle in accordance with the operation of a steering wheel for generating steer angle of front wheels. The apparatus comprises a first member which moves in response to the operation of the steering wheel; a second member which moves in response to the operation of the steering wheel in a direction counter to that of the first member; an output shaft for controlling the steer of the rear wheels; a resilient member disposed between the first member and the output shaft and a controller disposed between the second member and the output shaft for controlling the direction of movement of the output shaft in accordance with the speed of operation of the steering wheel. When the steering wheel is operated at high speed, the resilient member absorbs the force from the first member so that the output shaft moves in the same direction as the second member, whereby the rear wheels are turned in a direction counter to that of the front wheels. When the steering wheel is operated at low speed, the force from the second member is damped so that the output shaft moves in the same direction as the first member, whereby the rear wheels are turned in the same direction as the front wheels.

24 Claims, 49 Drawing figures

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 198 16 928 A (NISSAN MOTOR) 22 October 1998 (1998-10-22) * column 1, line 63 - column 2, line 14 * * column 4, line 59 - column 6, line 58 * * figures 1-5 * -----	1,2,4,5, 7,11,12	B62D15/02
D,A	-& PATENT ABSTRACTS OF JAPAN vol. 1999, no. 01, 29 January 1999 (1999-01-29) -& JP 10 287262 A (NISSAN MOTOR CO LTD), 27 October 1998 (1998-10-27) * abstract *		
A	EP 0 799 755 A (FORD WERKE AG ; FORD FRANCE (FR); FORD MOTOR CO (GB)) 8 October 1997 (1997-10-08) * abstract; claims; figures *	1,2,11, 12	
A	US 2002/133278 A1 (LEAPHART ELDON GERRALD) 19 September 2002 (2002-09-19) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B62D B60T
3 The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		19 August 2004	Kulozik, E
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 03 02 4905

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-08-2004

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